editor might have been increased in number and made really conversational in form. This could have been done by making a good dialogue between two persons, an exercise will be found very interesting by students and very practical.

Der Bibliothehar. Von GUSTAV VON MOSER. Edited by W. A. COOPER. New York: American Book Co.

This is a delightful farce, full of the spirit of the German language and one that students always enjoy. It is of great value in conversational work in German, as experience has taught. Had the editor added some good, well-planned exercises, he would have increased the value of the edition tenfold.

Das Spielmannskind und der stumme Ratsherr. Von W. H. RIEHL. Edited, with Notes and Vocabulary, by G. M. PRIEST. New York: American Book Co.

Riehl's stories are very interesting and instructive to those more advanced students who take an interest in the past of any country, in its institutions, manners, and social life. Riehl's style is at once charming and difficult, and for that reason great care must be taken with the vocabulary. It would be an improvement in such books if the page and line were noted wherever a word has a peculiar force and needs particular care in translation to convey the author's meaning. Otherwise the edition before us seems to be carefully done.

Minna von Barnhelm. Von G. E. LESSING. Special Edition, with Vocabulary, by SYLVESTER PRIMER. Boston: D. C. Heath & Co., 1902.

In this special edition Professor Primer has cut down his introduction, added twelve plates of Chodowiechi's scenes from *Minna* and for school use has also added a vocabulary. The book in its present form will have the new lease of life it deserves.

L. E. HORNING.

VICTORIA COLLEGE,
The University of Toronto.

The Teaching of Chemistry and Physics in the Secondary School. By ALEXANDER SMITH AND EDWIN H. HALL. New York. Longmans, Green & Co., 1902. $1.50.

THIS book is in two parts. The first part, on chemistry, by Professor Smith, contains 227 pages; the second, by Professor Hall, on physics, contains 144 pages.

The book will be read with great profit by teachers of chemistry and physics. and those copies that fall into the hands of superintendents and principals will be no less effective in promoting the interests of education.

It will be convenient to review the two parts separately.

Professor Smith gives reasons for the study of science, and sketches the history of chemistry teaching. He thinks that the present "average instruction" is far below what it might be and ought to be. He discusses the place for chemistry in the curriculum, the conclusion being that physics should precede chemistry and that chemistry should be placed in the last year of the high-school course. After dealing with the motive of the Committee of Ten for recommending the reverse order, the author suggests that the teacher of physics can easily give the necessary instruction in geometry, and thus the postponement of the work for a whole year may be avoided.

The reader will be pardoned if, as he reads this chapter, he wonders why the same argument will not apply to the teaching of a few physical laws by the chemistry teacher. He may even speculate as to which is easier: to teach chemistry to students who do not know Boyle's law, or to teach physics when they are unable to comprehend the action of an acid on zinc in the simple voltaic cell, and when they know nothing of similar triangles or simultaneous equations.

The choice of introductory material is considered with reference to three possible systems of arrangement: the nature-study method, the theoretical method, and the historico-systematic method. The latter appears to the author to meet the needs of most schools. It is shown that the purpose of the instruction should be to be to develop the powers of observation and reasoning, and to cultivate the right attitude toward scientific investigation, rather than to impart a knowledge of a large number of scientific facts. "Intensive rather than extensive work" is recommended. The arguments against qualitative analysis in the high school seem conclusive, while an excellent substitute for this work is suggested.

The proper place for the atomic theory and for atomic weights is shown and the experimental basis of valency is explained. A chapter is devoted to each of the subjects: "Instruction in the Laboratory," "Instruction in the Class Room;" "Some Constituents of the Course," "The Laboratory, and "The Teacher."

The book is full of suggestive material. Its bibliography is extensive and carefully arranged.

An idea of the spirit of the second part of the work may be obtained from the closing sentence of Professor Hall's prefatory note. He says: "Writing these chapters has interested the author and has improved his teaching. He hopes that reading them may be equally beneficial to others."

The teacher, his qualifications, and his preparation are first discussed; then follows a chapter entitled "The Teacher as a Student." Here the problem of research work for teachers of secondary schools is treated. The author has only commendation and encouragement for those who can carry on such work, but for many he feels that it is impossible, and for such he points out a wide field and an immediate opportunity for original work. He says: "Is there an habitual experiment or an habitual laboratory exercise that goes badly? If so, just there lies the opportunity and the motive for research."

Another chapter is entitled "Discovery, Verification, or Inquiry." This is a thoroughly sane treatment of a subject involving the attitude of the student toward the work in hand. The absurdity of insisting that all information must come through the inductive method is pointed out, and the other extreme, the process of verifying known laws, is discouraged. To quote from the author: "I would keep the pupil just enough in the dark as to the probable outcome of his experiment, just enough in the attitude of discoverer, to leave him unprejudiced in his observations, and then I would insist that his inferences, so far as they profess to be derived from his own seeing, must agree with the record, previously made and unalterable, of these observations."

Professor Hall does not believe in laboratory work without lectures and recitations. He favors some elementary physics in the grammar school on the ground that a majority never enter the high school. The recommendations of the National Educational Association committee receive considerable attention. One chapter is devoted to the presentation of dynamics, and one to the plan and equipment of a

laboratory. The closing chapter, on "Physics Teaching in Other Countries," contains much that is interesting and encouraging. He concludes that the best secondary schools in America have little or nothing to learn concerning the teaching of physics from the corresponding schools in Germany, France and England.

The book in both its parts is worthy of the highest commendation, and its authors are entitled to the gratitude of all who are interested in the progress of science in education.

N. H. WILLIAMS.

THE SHORTRIDGE HIGH SCHOOL,
Indianapolis.

The Newtonian Potential Function. By B. O. PEIRCE. Third revised and enlarged edition. New York: Ginn & Co.

THE principal change made in the third edition is the addition of a large number of miscellaneous problems at the end of the work. These problems are accompanied by occasional indications of solutions and by notes, and contain important results in attractions, electrostatics, magnetism, and current electricity. They constitute a valuable addition.

The book has two divisions, the first consisting of four chapters on gravitation the potential function, surface distributions of attracting matter, Green's theorem, the properties of vectors, and the attraction of ellipsoids; and the second division of one chapter, which is divided into four parts, on electrostatics, electrokinematics, electromagnetism, and current induction. The exposition of the equation of Laplace, the theorems of Green, Gauss, and Stokes, and Dirichlet's principle, is accompanied by much illustration, and the treatment is given an elementary character by copious and careful explanations. The elements of the mathematical theory of electricity in the second division are quite complete, but are not based on general dynamical principles, as, following Maxwell and Helmholtz, is done by Webster and other writers, giving a more advanced treatment. No use is made of the method of variations or of generalized co-ordinates in deriving the equations which relate to dielectrics or to electromagnetic induction. The generalized equations of Poisson are introduced as giving the result of experiment on dielectrics. In some places the two-fluid theory of electricity is used as a convenient physical analogy.

The first chapter contains the statement of the law of gravitation and the determination of the attraction exerted by bodies of various forms. The interesting problem of the variation of latitude due to a hemispherical hill is treated. The second chapter defines the potential function due to attracting matter and determines it in particular cases. The question of the continuity of first and second derivatives of the potential function is discussed. The equations of Laplace and Poisson and the theorem of Gauss are derived. The third chapter is devoted to the potential function in the case of repelling forces. The fourth chapter gives a treatment of surface distributions, of Green's theorem, of Dirichlet's principle, and of the attraction of homogeneous ellipsoids.

The fifth chapter, which comprises more than one-half of the book, exclusive of the problems, applies the results of the first four chapters to electricity. The properties of electric distributions and of tubes of force are given, as well as the important facts about condensers, the energy of charged conductors, specific inductive capacity,